

portion than the ejection speed at its tailing portion, then the ink droplet impacts onto the recording sheet 406 while having an elongate shape rather than a [spherical] circular shape. This results in forming a dot having an unusual dot shape, such as the dot 404. The dot 405 is called satellite dot which has a larger dot and a smaller dot formed below and

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separated from the lager dot. The satellite dot is formed when speed difference between a leading portion and a tailing portion of an ejected ink droplet is greater than that of the dot [405] 404. That is, an ink droplet being ejected is divided into two or more droplets before the ink droplet impacts on the recording sheet 406 because of the speed difference. When recorded dots include these unusual dots, quality of images will be undesirably degraded. Such problems occur in any type of on-demand ink jet printer regardless of which type of ink or nozzles are used.

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The driving data 212 generated in this manner may be temporarily stored in a memory (not shown) provided to the computer portion [210] 201. Then, printing may be executed when a plurality of pages worth of driving data 212 is stored in the memory. However, in the present embodiment, the printing is executed every time when one page worth of driving data 212 is generated.

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When nozzle data converting portion 204 has generated the driving data 212, then the controller 205 controls the sheet feed unit 208 to feed a recording sheet. When a print start position of the recording sheet is detected, then the controller 205 transmits the driving data 212 from the computer portion [210] 201 to the piezoelectric element driver 206. The piezoelectric element driver 206 generates a driving signal 213 with a relatively high voltage value based on the driving data 212. The driving signal 213 is then input to the signal input terminal 305 of the corresponding piezoelectric element 304 provided to the print head.

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The deflection electrodes [1430] 1403 includes a first electrode [1430-1] 1403-1 and a

second electrode [1430-2] 1403-2. The first electrode [1430-1] 1403-1 is applied with a deflection voltage V_c and a deflection voltage $[V_b] \underline{V_d}$. The deflection voltages V_c and $[V_b] \underline{V_d}$ have a predetermined voltage value greater than 0v. The second electrode 1403-2 is applied with a deflection voltage $-V_c$ which has an opposite polarity of the deflection voltage V_c applied to the first deflection electrode 1403-1, and also with a deflection voltage $[V_b] \underline{V_d}$ which has the same polarity with the deflection voltage $[V_b] \underline{V_d}$ applied to the first deflection electrode 1403-1. Accordingly, a deflection electric field [element] E_c is generated between the deflection electrodes 1403-1 and 1403-2. The deflection electric fields [element] E_c corresponds to a deflection

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voltage difference $2V_c$ between the deflection electrodes 1403-1 and 1403-2. Also, because the nozzle plate 1401 is formed from a conductive material and is grounded, a deflection electric field element E_b corresponding to the deflection difference $[V_b] \underline{V_d}$ is generated near the nozzle 207a.

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When an ink droplet 1502 is ejected, the ink droplet [406] 1502 is charged in the positive polarity by a charging amount q because of the electric field [element] E_b . Thus charged ink droplet 1502 deflects rightward in Fig. 15 because of the deflection electric field [element] E_c . Accordingly, an impact position of the ink droplet 1502 is shifted rightward.

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A driving data 212 is input to the circuit [2012] 2102. When the circuit [2012] 2102 detects a rising point of the received driving data 212, the counter 2103 starts counting the driving data clock 2104 and also outputs an ON-signal 2106 indicating that the counter 2103 is driving. The ON-signal 2106 is output to the logical multiplication 2105. Having counted eight clocks, the counter 2103 stops driving. The driving data 212 is also input to the logical multiplication 2105. When the logical multiplication 2105 receives the ON-

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signal 2106, the logical multiplication 2105 outputs the driving data 212 to the shift register 2101. The driving data clock 2104 is also input to a clock of the shift register [2102] 2101 via the selector 2107, so eight bits of the driving data 212 is stored into the clock of the shift register [2101] 2101 one bit at a time. When an end of the ON-signal 2106 from the counter 2103 is detected, the counter 2108 starts. The counter 2108 counts a predetermined pulse data clock 2109, and stops counting when the counter 2108 has counted eight clocks. When an output signal from the counter 2108 is an ON-signal indicating that the counter 2108 is driving, then the selector 2107 switches to receive the pulse data clock 2109. Also, the shift register 2101 outputs the eight bits of the driving data 212 to the piezoelectric element driver 206 in synchronization with the pulse data clock 2109.

IN THE CLAIMS:

Please cancel claims 1. Please amend claims 2-3, 8-9, 12-13 as follows. A clean copy of amended claims 2-3, 8-9, 12-13 is provided in the attached separate sheet, entitled "Clean Copy of Amended Claims."

- 1 Claim 2 (Amended). An [The] ink jet recording device [according to claim 1, further]
- 2 comprising:
- 3 a head formed with a plurality of nozzles;
- 4 a converting unit that converts recording data into driving data, the driving data
- 5 including data sets defining driving pulses for corresponding ones of the plurality of
- 6 nozzles;
- 7 a feed unit that feeds a recording medium in a first direction;
- 8 an ejection element provided to each one of the plurality of nozzles for ejecting an
- 9 ink droplet from the corresponding nozzle onto the recording medium in response to the
- 10 driving data while the feed unit is feeding the recording medium in the first direction;
- 11 a memory that stores nozzle profile data including waveform data and timing for
- 12 each of the plurality of nozzles, the waveform data and the timing data indicating a